RO-494

URS

June 19, 2003

Ms. eva chu
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: Remedial Action Plan, ARCO Service Station #2111
1156 Davis Street, San Leandro, California

Dear Ms. chu:

On behalf of Atlantic Richfield Company (ARCO - an affiliated company of the Group Environmental Management Company), URS Corporation (URS) has prepared this Remedial Action Plan (RAP) for the ARCO Service Station #2111 located at 1156 Davis Street in San Leandro, California (the Site, Figure 1). As requested by the Alameda County Health Care Services Agency (ACHCSA), the report contains an outline for migration control and a proposal to delineate the extent of the plume. This RAP involves the design of a dual phase extraction (DPE) system and the installation of one downgradient groundwater monitoring well.

We appreciate the opportunity to present this RAP to the ACHCSA on behalf of ARCO and trust that this document meets with your approval. Please do not hesitate to contact us at (510) 874-3280 with any questions or comments.

Sincerely,

URS CORPORATION

Scott Robinson
Project Manager

Barbara Jakub, R.G.
Senior Geologist

REGISTERED GEOLOGIST
BARBARA J JAKUB
No. 7304
STATE OF CALIFORNIA

Attachments: Remedial Action Plan

cc: Paul Supple, Atlantic Richfield Company, PO Box 6549, Moraga, CA 94549

URS Corporation
500 12th Street, Suite 200
Oakland, CA 94607 4014
Tel: 510.893.3600
Fax: 510.874.3268

REPORT

REMEDIAL ACTION PLAN
ARCO SERVICE STATION #2111
1156 DAVIS STREET
SAN LEANDRO, CALIFORNIA

Prepared for
Atlantic Richfield Company

June 19, 2003

URS
URS Corporation
500 12th Street, Suite 200
Oakland, CA 94607-4014

38486297

TABLE OF CONTENTS

Tables

Figures

Appendices

On behalf of Atlantic Richfield Company (ARCO - an affiliated company of the Group Environmental Management Company), URS Corporation (URS) has prepared this Remedial Action Plan (RAP) for the ARCO Service Station #2111 located at 1156 Davis Street in San Leandro, California (the Site, Figure 1). This RAP was prepared in response to the Alameda County Health Care Services Agency (ACHCSA) April 25, 2003 letter (Appendix A) which responded to the October 7, 2002 URS Corrective Action Plan (CAP). This RAP outlines the protocol for implementing a hydraulic control system using dual phase extraction (DPE) technology and performing additional investigation to delineate the hydrocarbon impacted groundwater plume.

The Site is an active ARCO service station located at the northwest corner of the intersection of Preda Street and Davis Street (Figure 2). The majority of the property is concrete and asphalt paved. Current Site structures include two double-walled fiberglass gasoline underground storage tanks (USTs), two pump islands with dispensers, and a convenience store. The area surrounding the Site consists primarily of commercial and residential properties. The Site is bordered to the southeast by Davis Street, to the northeast by Preda Street, to the southwest by First Christian Church and Community Center, and to the northwest by residential homes. Based on the information provided by the County of Alameda Public Works Agency (EMCON 1996), there are several irrigation, monitoring, and industrial wells located downgradient of the Site. The nearest domestic supply well (#2S/3W 27R-7) is located approximately 650 feet west-southwest of the Site. EMCON determined that wells located hydraulically downgradient of the Site are not impacted by the ARCO facility.

Site investigations, source removal and interim remedial activities have been conducted at the Site since 1995. Reports of the investigations are listed in Section Seven – References. Previous investigations have identified the source of petroleum hydrocarbons to be in the vicinity of the former USTs and fuel dispensers and are limited to the capillary fringe zone (EMCON 1996).

A groundwater monitoring program has been implemented at the Site since 1995. The current groundwater monitoring well network consists of five on-Site groundwater monitoring wells (MW-1 to MW-4 and MW-7), three on-Site vapor extraction wells (VW-1 to VW-3), and two off-Site groundwater monitoring wells (MW-5 and MW-6). As shown on Figures 2 and 3, the off-Site wells are located east and west of the Site. The groundwater monitoring wells are typically screened from 12 to 26 and 10 to 25 feet below ground surface (ft bgs), and the vapor extraction wells are screened from 5 to 20 ft bgs. Well construction data is provided on Table 1. The groundwater monitoring program consists of quarterly monitoring of free product and groundwater levels and sampling for total petroleum hydrocarbons as gasoline (TPH-g), benzene, toluene, ethyl benzene, total xylenes (BTEX), and methyl-tertiary butyl ether (MTBE). Historical groundwater quality data shows reducing concentration trends from the historical high detections (Table 2). Groundwater analytical results from the Second Quarter 2003 Monitoring Report are shown on Figure 3. Historically, levels of free product have been found in MW-1, MW-2, and MW-7. Monitoring well MW-2 has been the only well to contain free product since June 2000. As shown on Table 2 and 3, the historical groundwater quality data indicates the groundwater plume is relatively unstable and hydraulic control is needed to control migration of constituents further downgradient. Therefore, this RAP will provide a framework for hydraulically controlling the groundwater plume and at the same time remediating hydrocarbon impacted groundwater.

The objective of this RAP is to develop a remedial strategy to achieve Site closure by maintaining beneficial uses of groundwater resources and protecting human health. Specifically, this will be achieved by the following:

- **Groundwater-based.** Within physical and economic constraints, eliminate hazardous and nuisance conditions associated with the presence of dissolved hydrocarbons and MTBE in the subsurface environment at the Site. This includes reducing dissolved-phase mass and controlling migration of petroleum hydrocarbon and MTBE in groundwater in excess of the proposed water cleanup levels. It also includes protecting the potential use of the water-bearing zones underlying the Site vicinity.
- **Soil-based.** To the extent economically feasible using established technology, preventing migration and hazardous or nuisance conditions associated with the presence of hydrocarbons and MTBE in Site soils. This will be accomplished by reducing residual concentrations that may serve as a significant secondary source for further impact to groundwater in the Site vicinity, and preventing public exposure to impacted soils.

Initial water quality goals for the Site focus on protecting the existing water quality goals to protect all present and potential beneficial uses. Numeric water quality goals are based on Resolution 68-16 and are associated with background levels for municipal and domestic supply, which in turn are subject to the detection limits for residual constituents of concern. These water quality goals are:

Chemical	Concentration	Source
MTBE	5 µg/L	Title 22 California Code of Regulations (22 CCR) Secondary Maximum Contaminant Limit (MCL)
Benzene	1 µg/L	22 CCR Primary MCL
Toluene	150 µg/L	22 CCR Primary MCL
Ethylbenzene	700 µg/L	22 CCR Primary MCL
Xylene	1,750 µg/L	22 CCR Primary MCL

No Primary MCL for TPH-g has been established.

The proposed Site water quality goals apply to the Site during remedial action and beyond; however, they may be modified at any time if it can be shown that changes are consistent with the maximum benefit to the people of the state and will not unreasonably affect present or probable future beneficial uses of groundwater.

3.1 GEOLOGY

The subsurface consists of unconsolidated alluvial sediments predominantly composed of clays to silty clays, which are underlain locally by clayey sands to sandy gravels to the total explored depth of 40 ft bgs. The typical stratigraphic relationships of the sediments are depicted on geologic cross sections located in Appendix B.

The Site is located in the East Bay Plain, a relatively flat alluvial plain that lies between San Francisco Bay to the west and the Diablo Range to the east (EMCON 1996).

3.2 GROUNDWATER DEPTH, FLOW AND GRADIENT

Groundwater beneath the Site is typically measured at 10 to 20 ft bgs. The historical groundwater flow direction beneath the Site is generally westward. The gradient has ranged from 0.002 to 0.009 from July 2000 through April 2003. Regionally the groundwater in the East Bay Plain tends to flow toward the San Francisco Bay to the west and southwest. Groundwater elevation, flow direction and gradient for the Site are summarized in Tables 3 and 4.

In the most recent groundwater monitoring event (Second Quarter 2003), groundwater measured beneath the Site was 13.61 to 16.61 ft bgs. The groundwater flow direction beneath the Site was to the northwest at a hydraulic gradient of 0.009. The groundwater contour map for the Second Quarter 2003 is shown on Figure 3.

3.3 DUAL PHASE EXTRACTION PILOT TEST RESULTS

Delta Environmental Consultants, Inc. (Delta) performed a DPE pilot test in January 2002 on three on-Site wells (MW-2, MW-7 and V-2). The pilot test showed that it is reasonable to expect groundwater levels can be adequately lowered by a DPE system to expose soils to atmospheric oxygen that would enhance natural attenuation and extract and treat the groundwater. The wells completed in finer grain materials (MW-7 and V-2) would be more effective in creating an efficient ratio of groundwater volume extracted to contaminants removed. Based on the pilot study results, a radius of influence of approximately 32 feet is expected and the existing vapor and monitoring wells would provide adequate remedial coverage for the impacted area near the dispensers and the former USTs.

This RAP consists of the preliminary design, installation, and operation plans for a hydraulic control system using dual phase extraction (DPE) technology. Groundwater monitoring would be continued as part of the regularly scheduled events along with installing an additional downgradient monitoring well to further delineate the extent of the plume. The proposed well location is shown on Figure 2.

A DPE system would likely achieve MTBE and benzene mass removal from the saturated and unsaturated zone. DPE uses a high vacuum to extract both groundwater and soil vapor from a common extraction well. The technique involves using a large diameter extraction well (at least 4-inch diameter) with a smaller diameter drawtube installed within the extraction well. A vacuum is applied to the drawtube and groundwater is initially extracted, depressing the water table and exposing a large portion of the screened interval of the extraction well. After groundwater has been depressed by high vacuum via the drawtube, soil vapors and groundwater are then extracted simultaneously. The depressed water table allows soil vapor to flow through the capillary zone and creates a hydraulic gradient minimizing migration of dissolved hydrocarbons. The turbulent mixing of groundwater and soil vapor during the combined extraction will volatilize petroleum hydrocarbons from the extracted groundwater and reduce the need for groundwater treatment.

The DPE high vacuum system will be connected to the seven existing on-Site wells (MW-1 through MW-3 and MW-7, V-1 through V-3). The existing conveyance piping is shown on Figure 4. Based on the DPE pilot test results, it is anticipated that the groundwater extraction well network will produce at a rate of approximately 20 to 25 gallons per minute (gpm). The DPE extraction system includes a high vacuum blower, air/water separator, and a transfer pump. The extracted soil vapor stream will be treated by a vapor phase granular activated carbon (GAC) system or a thermal/catalytic oxidizer. Groundwater extracted by the DPE system will be stored in a batch holding tank and will be treated by an air stripper, if necessary, or by a liquid phase GAC system to within acceptable National Pollution Discharge Elimination System (NPDES) discharge limits or limits set by the sanitary sewer permit. General mineral levels in extracted groundwater will be collected to determine whether or not a chemical injection system is needed to prevent fouling of the air stripper system. Off gas from the air stripper will be treated by a soil vapor treatment system (vapor phase GAC and/or thermal/catalytic oxidizer). A liquid phase GAC system including two carbon vessels connected in series will be used to polish treated water from the air stripper before discharge. The preliminary design the DPE system is shown on Figures 4 and 5.

4.1 FINAL REMEDIATION SYSTEM DESIGN

Final remediation system design drawings, general conditions and specifications will be prepared for the proposed DPE system after RAP approval by the ACHCSA. The technical specifications will address details of the design not included in the design drawings, including the methods, engineering standards, and material which must be used by the contractor during construction. The general conditions will present contractual language regarding the requirements. Specifications for extraction and treatment process equipment will be prepared to aid procurement of the equipment.

4.2 PERMITTING

All necessary permits for system construction and operation will be obtained prior to system installation. Based on the selected remedial method, the following construction and operating permits will be required for the proposed system:

- Building permit from the City of San Leandro;
- Bay Area Air Quality Management District (BAAQMD) permit for possible vapor abatement and/or discharge; and,
- NPDES groundwater discharge permit or sanitary sewer discharge permit.

4.3 PRE-CONSTRUCTION ACTIVITIES

The construction bid package will be distributed to a minimum of three qualified contractors with experience performing similar projects. A pre-bid walk will be performed to allow potential contractors to view the Site and direct questions to the design engineer regarding construction specifications. Competitive bids will be procured from the quality contractors and the client will select a contractor based on contractors' capabilities to perform the work and their submitted bid cost.

Process equipment will be procured prior to construction based on the specifications prepared during the design phase. Equipment delivery will be coordinated to meet the construction scheduling needs of the selected contractor.

4.4 CONSTRUCTION ACTIVITIES

4.4.1 Groundwater Well Installation

An additional downgradient well will be installed prior to system construction. One soil boring will be advanced by hand auger and a drill rig equipped with hollow-stem augers, under the supervision of a URS field geologist, to a depth of approximately 25 ft bgs. The boring will be converted to a 4-inch monitoring well and screened from approximately 10 to 25 ft bgs. A typical monitoring well construction diagram is located in Appendix C. The exact depth and length of screen of the new well will be determined based on lithology of the boring and by a registered geologist. The well will be installed using Schedule 40 PVC 0.010-inch slotted well screen and #2/12 sand filter pack one to two feet above the top of the well screen. The filter pack will be overlain by one to two feet of bentonite and neat cement grout to the surface. A traffic rated well box will be installed to grade.

After it has been installed, the well will be surveyed as part of a Site wide re-surveying project, which will included finding the top of casing elevation with respect to mean sea level, and for lateral position using latitude and longitude.

Within 48 hours after well installation, the new monitoring well will be developed. The process will consist of surging and bailing the well to remove fine-grained sediments from the well and sand pack. A minimum of three and a maximum of ten casing volumes of groundwater will be removed until water quality parameters have stabilized. Periodic measurements of pH, conductivity, temperature, and turbidity will be recorded during development to establish

baseline values for groundwater. The groundwater well will be added to the quarterly monitoring scheme.

Prior to initiating well installation activities, URS will obtain necessary permits, prepare a Site Health and Safety Plan (HASP) for the proposed work, conduct a subsurface utility clearance, and complete the URS borehole checklist (Appendix D). The utility clearance will include notifying Underground Service Alert (USA) of the pending work a minimum of 48 hours prior to initiating the field investigation, and securing the services of a private utility locating company to confirm the absence of underground utilities at each boring location. A well installation report will be prepared and submitted to the regulatory agency within 60 days of completion of well installation activities.

4.4.2 Remediation System Installation

The remediation system construction will commence upon procurement of all system construction and operation permits and completion of pre-field activities. URS will provide construction management during construction activities. This includes on-Site management of contractor and subcontractor personnel. An experienced representative will be present to document Site activities using daily logs and photographic documentation. The representative will verify compliance with design drawings, construction specifications, building permits, the Site Health and Safety Plan, and construction schedules. The representative will also maintain revisions to a job-copy of the design drawings for preparation of as-built drawings.

4.4.3 Waste Characterization and Disposal

Waste material will be generated from the groundwater well installation. Wastewater will be generated from the steam cleaning of drill augers during the well installation and during well development. Waste soil and water will be temporarily stored on-Site, sampled, characterized, transported, and properly disposed as necessary during construction activities.

4.5 REMEDIATION SYSTEM TROUBLESHOOTING AND START-UP

Upon completion of system construction, a system shake down will be conducted to verify the correct operation of all process equipment and controls and to troubleshoot and repair or replace any component of the system not operating correctly. Once URS determines the system is fully operable, the system startup will be performed. The system will be monitored and sampled according to the conditions of each of the system operating permits. Data from the startup will be tabulated as necessary to prepare a report, or reports, to fulfill startup reporting requirements of each permit.

4.6 REMEDIATION SYSTEM OPERATION, MAINTENANCE, MONITORING AND REPORTING

An Operation & Maintenance (O & M) Manual will be prepared as a stand-alone document to assist personnel maintaining the operation and performing compliance monitoring of the remediation system. The system manual will include as-built drawings, monitoring and maintenance checklists and schedules, troubleshooting guides, and equipment operating manuals.

The remediation system will be operated until cleanup goals are achieved or until such a time as the remediation effort is shown to no longer be technically or economically feasible. Throughout the life of the system, its operation will be monitored, at a minimum, to verify permit compliance and to meet permit reporting requirements. Site groundwater monitoring and system efficiency reports will be prepared and submitted on a quarterly basis.

System efficiency reporting will include summaries of mass extracted, mass extraction rates, and any modifications to system operation. Extracted mass will be compared to estimated mass of contaminants before remediation began and groundwater concentrations will be compared to groundwater cleanup goals to evaluate progress toward remediation of the Site.

ACHCSA will be asked to review the results of the efficiency reports to continually assess the applicability of Site cleanup goals. These results will also be used to determine the need for Site closure activities.

4.7 SITE CLOSURE ACTIVITIES

Once it has been determined that cleanup goals have been, or may have been achieved, a confirmatory sampling program or data analysis may be proposed to verify that impacted soil and groundwater has been remediated sufficiently to receive closure.

A schedule for the tasks described in this RAP is based on a timely review and approval of documents by regulatory agencies and assumes that there will not be prolonged delays to procure permits. Any delays will be documented and modifications to the schedule will be reported in quarterly activity reports.

It is estimated the project will require approximately eighteen (18) weeks to complete. Subsequent to the ACHCSA approval of the RAP, permit procurement, implementation will require an estimated four (4) weeks. Actual construction coordination and activities will take an additional six (6) weeks. A Completion Report will be submitted to the ACHCSA approximately eight (8) weeks after the Work Plan implementation.

This report is based on data, Site conditions, and other information that are generally applicable as of the date of the report, and the conclusions and recommendations herein are therefore applicable only to that time frame.

Background information, including but not limited to previous field measurements, analytical results, Site plans, and other data has been furnished to URS by Group Environmental Management Company, its previous consultants, and/or third parties that URS has used in preparing this report. URS has relied on this information as furnished. URS is not responsible for nor has it confirmed the accuracy of this information.

The analytical data provided by the laboratory approved by Group Environmental Management Company have been reviewed and verified by that laboratory. URS has not performed an independent review of the data and is neither responsible for nor has confirmed the accuracy of these data.

Alameda County Health Care Services Agency. 2000. Letter to Mr. Paul Supple of ARCO Product Company, Re: ARCO Service Station No. 2111, 1156 Davis Street, San Leandro, California. October 12.

Alameda County Health Care Services Agency. 2002. Letter to Mr. Paul Supple of ARCO Product Company, Re: ARCO Service Station No. 2111, 1156 Davis Street, San Leandro, California. June 26.

Alameda County Health Care Services Agency. 2003. Letter to Mr. Paul Supple of ARCO Product Company, Re: Mitigation Control at ARCO Station 2111 at 1156 Davis St, San Leandro, CA. April 25.

Delta Environmental Consultants, Inc. 2001a. *Well Destruction Report,* ARCO Service Station No. 2111, 1156 Davis Street, San Leandro, California. March 17.

Delta Environmental Consultants, Inc. 2001b. *Tank Basin, Product Line and Dispenser Island Sampling Results,* ARCO Service Station No. 2111, 1156 Davis Street, San Leandro, California. February 2.

Delta Environmental Consultants, Inc. 2001c. *Sump Sampling Results,* ARCO Service Station No. 2111, 1156 Davis Street, San Leandro, California. August 21.

Delta Environmental Consultants, Inc. 2002. *Results of Dual Phase Extraction Pilot Test* ARCO Service Station No. 2111, 1156 Davis Street, San Leandro, California. July 16.

EMCON. 1996. *Soil and Groundwater Assessment Report*, ARCO Service Station 2111, San Leandro, California. September 19.

EMCON. 1997. *Resubmittal of Tier 1, Tier 2 Risk-based Corrective Action Evaluation,* ARCO Service Station 2111, 1156 Davis Street, San Leandro, California. May 23

IT Group. 2000. *High Vacuum Extraction Pilot Test Report*, ARCO Service Station No. 2111, 1156 Davis Street, San Leandro, California. May 3.

SFBRWQCB. 1995. Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan). San Francisco Bay Regional Water Quality Control Board. Region 2. June 21.

URS Corporation. 2002. Corrective Action Plan, ARCO Service Station No. 2111, 1156 Davis Street, San Leandro, California for Atlantic Richfield Company. October 7.

Table 1
Well Construction Data

ARCO Service Station #2111
1156 Davis Street
San Leandro, California

Well No.	Installation Date	Boring Diameter (inch)	Well Diameter (inch)	Screen Size (inch)	TOC Elevation (ft-msl)	Boring Depth (feet bgs)	Surface Seal (feet bgs)	Sand Pack Interval (feet bgs)	Screened Interval (feet bgs)
MW-1	7/12/1995	10	4	0.020	39.60	30.0	0-12	10.5-27.0	12.5-26.2
MW-2	7/12/1995	10	4	0.020	37.99	30.5	0-10	10.0-27.0	12.0-26.2
MW-3	7/13/1995	10	4	0.020	39.32	40.0	0-11	11.0-27.0	11.9-26.2
MW-4	7/13/1995	10	4	0.020	38.10	28.5	0-8.5	8.5-25.0	10.0-24.0
MW-5	3/1/1996	8	2	0.010	37.21	30.0	0-8.0	8.0-23.0	9.4-23.4
MW-6	3/1/1996	8	2	0.010	37.11	27.5	0-9.0	9.0-25.0	10.0-25.0
MW-7	2/29/1996	10	4	0.010	38.68	33.5	0-10.5	10.5-27.0	12.0-27.0
VW-1	2/29/1996	10	4	0.020	38.94	20.0	0-5.0	5.0-20.0	5.0-20.0
VW-2	2/29/1996	10	4	0.020	38.28	20.0	0-5.0	5.0-20.0	5.0-20.0
VW-3	2/29/1996	10	4	0.020	38.01	20.0	0-5.0	5.0-20.0	5.0-20.0
VW-4	2/28/1996	10	4	0.020	38.38	20.0	0-6.5	6.5-20.0	6.5-19.5

Abbreviations and Notes:

feet bgs = feet below ground surface
ft-msl = feet above mean sea level

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Free Product Thickness feet	Groundwater Elevation ft-MSL	Water Sample Field Date	**TPHG** LUFT Method µg/L	**Benzene** EPA 8021B* µg/L	**Toluene** EPA 8021B* µg/L	**Ethylbenzene** EPA 8021B* µg/L	**Total Xylenes** EPA 8021B* µg/L	**MTBE** EPA 8021B* µg/L	**MTBE** EPA 8260 µg/L	**TRPH** EPA 418.1 µg/L	**TPHD** LUFT Method µg/L	Dissolved Oxygen mg/L	Purged/ Not Purged P/NP
MW-1	08-01-95	39.60	17.45	ND	22.15	08-01-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--		
MW-1	12-14-95	39.60	17.09	ND	22.51	12-14-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	03-21-96	39.60	14.72	ND	24.88	03-21-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	05-24-96	39.60	15.94	ND	23.66	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	08-09-96	39.60	17.89	ND	21.71	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	11-06-96	39.60	18.66	ND	20.94	11-06-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	03-24-97	39.60	16.13	ND	23.47	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	05-27-97	39.60	17.23	ND	22.37	05-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	08-07-97	39.60	18.68	ND	20.92	08-07-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	11-10-97	39.60	19.19	ND	20.41	11-10-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	02-16-98	39.60	12.61	ND	26.99	02-16-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	04-15-98	39.60	14.30	ND	25.30	04-15-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	07-24-98	39.60	16.40	ND	23.20	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	10-19-98	39.60	17.90	ND	21.70	10-19-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	01-28-99	39.60	16.85	ND	22.75	01-28-99	<20,000	580	<200	<200	320	14,000	--	--	--		
MW-1	06-25-99	39.60	17.35	ND	22.25	06-25-99	730	140	5	3	2	7,700	--	--	--	0.79	NP
MW-1	08-25-99	39.60	18.20	ND	21.40	08-25-99	390	66	8.5	<2.5	8.6	3,700	--	--	--	1.56	NP
MW-1	11-10-99	39.60	17.77	ND	21.83	11-10-99	360	70	13	2.2	13	980	--	--	--	0.30	NP
MW-1	02-09-00	39.60	16.25	ND	23.35	02-09-00	190	4.5	0.9	<0.5	12	3,500	--	--	--	0.53	NP
MW-2	08-01-95	37.99	15.67	ND	22.32	08-01-95	23,000	1,300	310	500	3,500	--	--	--	--		
MW-2	12-14-95	37.99	15.36	ND	22.63	12-14-95	7,300	900	25	180	1,000	<200	--	--	--		
MW-2	03-21-96	37.99	12.84	ND	25.15	03-21-96	9,600	850	30	280	1,400	250	--	--	--		
MW-2	05-24-96	37.99	14.03	ND	23.96	05-24-96	2,300	300	<5	73	310	<25	--	--	--		
MW-2	08-09-96	37.99	16.10	ND	21.89	08-09-96	2,800	290	6	75	320	50	--	--	--		

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Free Product Thickness feet	Groundwater Elevation ft-MSL	Water Sample Field Date	**TPHG** LUFT Method µg/L	**Benzene** EPA 8021B* µg/L	**Toluene** EPA 8021B* µg/L	**Ethylbenzene** EPA 8021B* µg/L	**Total Xylenes** EPA 8021B* µg/L	**MTBE** EPA 8021B* µg/L	**MTBE** EPA 8260 µg/L	**TRPH** EPA 418.1 µg/L	**TPHD** LUFT Method µg/L	Dissolved Oxygen mg/L	Purged/ Not Purged P/NP
MW-2	11-06-96	37.99	16.98	ND	21.01	11-06-96	750	76	<1	15	51	110	--	--	--		
MW-2	03-24-97	37.99	14.22	ND	23.77	03-24-97	790	18	<1	2	6	280	--	--	--		
MW-2	05-27-97	37.99	15.42	ND	22.57	05-28-97	750	14	<1	<1	10	150	--	--	--		
MW-2	08-07-97	37.99	16.92	ND	21.07	08-07-97	360	31	<2.5	<2.5	15	260	--	--	--		
MW-2	11-10-97	37.99	17.52	ND	20.47	11-10-97	1,300	82	<5	14	49	550	--	--	--		
MW-2	02-16-98	37.99	12.04	ND	25.95	02-16-98	<2,500	<25	<25	<25	<25	4,200	--	--	--		
MW-2	04-15-98	37.99	12.34	ND	25.65	04-15-98	<10,000	<100	<100	<100	<100	7,300	--	--	--		
MW-2	07-24-98	37.99	14.45	ND	23.54	07-24-98	<2,500	<25	<25	<25	<25	1,500	--	--	--		
MW-2	10-19-98	37.99	16.08	ND	21.91	10-19-98	<1,000	18	<10	<10	<10	1,100	--	--	--		
MW-2	01-28-99	37.99	15.59	0.02	22.41 [1]	01-28-99	160,000	3,000	24,000	4,400	31,000	23,000	--	--	--		
MW-2	06-25-99	37.99	19.20	3.73[4]	21.51 [1]	06-25-99	120,000	6,900	21,000	2,600	19,000	18,000	17,000[3]	--	--	0.49	NP
MW-2	08-25-99	37.99	16.49	0.02	21.51 [1]	08-25-99	92,000	2,200	16,000	3,200	19,000	11,000	9,400[3]	--	--	0.84	NP
MW-2	11-10-99	37.99	16.08	ND	21.91	11-10-99	56,000	2,400	5,900	1,500	10,000	17,000	21,000[3]	--	--	0.41	NP
MW-2	02-09-00	37.99	14.85	ND	23.14	02-09-00	1,700	270	14	17	21	70,000	55,000[3]	--	--	0.97	NP
MW-3	08-01-95	39.32	17.00	ND	22.32	08-01-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	600	76[2]		
MW-3	12-14-95	39.32	16.70	ND	22.62	12-14-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	<500	<50		
MW-3	03-21-96	39.32	14.17	ND	25.15	03-21-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	<500	<50		
MW-3	05-24-96	39.32	15.30	ND	24.02	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	<500	<50		
MW-3	08-09-96	39.32	17.58	ND	21.74	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	<500	--		
MW-3	11-06-96	39.32	18.33	ND	20.99	11-06-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	03-24-97	39.32	15.44	ND	23.88	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	05-27-97	39.32	16.75	ND	22.57	05-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	08-07-97	39.32	18.35	ND	20.97	08-07-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	11-10-97	39.32	18.83	ND	20.49	11-10-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Free Product Thickness feet	Groundwater Elevation ft-MSL	Water Sample Field Date	**TPHG** LUFT Method µg/L	**Benzene** EPA 8021B* µg/L	**Toluene** EPA 8021B* µg/L	**Ethylbenzene** EPA 8021B* µg/L	**Total Xylenes** EPA 8021B* µg/L	**MTBE** EPA 8021B* µg/L	**MTBE** EPA 8260 µg/L	**TRPH** EPA 418.1 µg/L	**TPHD** LUFT Method µg/L	Dissolved Oxygen mg/L	Purged/ Not Purged P/NP
MW-3	02-16-98	39.32	11.99	ND	27.33	02-16-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	04-15-98	39.32	13.75	ND	25.57	04-15-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	07-24-98	39.32	15.90	ND	23.42	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	10-19-98	39.32	17.45	ND	21.87	10-19-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	01-28-99	39.32	16.40	ND	22.92	01-28-99	<100	14	4	<1	6	100	--	--	--		
MW-3	06-25-99	39.32	17.92	ND	21.40	06-25-99	83	9.0	1.4	<0.5	2.5	220	--	--	--	1.11	NP
MW-3	08-25-99	39.32	17.79	ND	21.53	08-25-99	240	41	12	3.7	9.9	160	--	--	--	1.13	NP
MW-3	11-10-99	39.32	17.37	ND	21.95	11-10-99	620	100	9.7	4.1	21	150	--	--	--	0.24	NP
MW-3	02-09-00	39.32	15.77	ND	23.55	02-09-00	<50	<0.5	0.7	<0.5	<1	180	--	--	--	0.62	NP
MW-4	08-01-95	38.10	15.65	ND	22.45	08-01-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--		
MW-4	12-14-95	38.10	15.35	ND	22.75	12-14-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	03-21-96	38.10	12.74	ND	25.36	03-21-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	05-24-96	38.10	14.03	ND	24.07	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	08-09-96	38.10	16.10	ND	22.00	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	11-06-96	38.10	17.00	ND	21.10	11-06-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	03-24-97	38.10	14.21	ND	23.89	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	05-27-97	38.10	15.38	ND	22.72	05-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	08-07-97	38.10	16.95	ND	21.15	08-07-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	11-10-97	38.10	17.53	ND	20.57	11-10-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	02-16-98	38.10	10.65	ND	27.45	02-16-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	04-15-98	38.10	12.20	ND	25.90	04-15-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	07-24-98	38.10	14.47	ND	23.63	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	10-19-98	38.10	16.20	ND	21.90	10-19-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	01-28-99	38.10	15.02	ND	23.08	01-28-99	340	52	5.5	<0.5	74	31	--	--	--		

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Free Product Thickness feet	Groundwater Elevation ft-MSL	Water Sample Field Date	**TPHG** LUFT Method µg/L	**Benzene** EPA 8021B* µg/L	**Toluene** EPA 8021B* µg/L	**Ethylbenzene** EPA 8021B* µg/L	**Total Xylenes** EPA 8021B* µg/L	**MTBE** EPA 8021B* µg/L	**MTBE** EPA 8260 µg/L	**TRPH** EPA 418.1 µg/L	**TPHD** LUFT Method µg/L	Dissolved Oxygen mg/L	Purged/ Not Purged P/NP
MW-4	06-25-99	38.10	15.57	ND	22.53	06-25-99	510	78	4.1	0.5	18	94	--	--	--	0.90	NP
MW-4	08-25-99	38.10	16.43	ND	21.67	08-25-99	660	130	21	6.4	39	110	--	--	--	1.01	NP
MW-4	11-10-99	38.10	16.02	ND	22.08	11-10-99	510	98	5.1	3.1	15	69	--	--	--	0.28	NP
MW-4	02-09-00	38.10	14.30	ND	23.80	02-09-00	<50	<0.5	0.9	<0.5	<1	55	--	--	--	0.67	NP
MW-5	03-21-96	37.21	12.60	ND	24.61	03-22-96	<50	<0.5	<0.5	<0.5	<0.5	82	--	--	--		
MW-5	05-24-96	37.21	13.71	ND	23.50	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	7	--	--	--		
MW-5	08-09-96	37.21	15.60	ND	21.61	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	8	--	--	--		
MW-5	11-06-96	37.21	16.36	ND	20.85	11-06-96	<50	<0.5	<0.5	<0.5	<0.5	100	--	--	--		
MW-5	03-24-97	37.21	13.87	ND	23.34	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	460	--	--	--		
MW-5	05-27-97	37.21	14.71	ND	22.50	05-28-97	<100	<1	<1	<1	<1	120	--	--	--		
MW-5	08-07-97	37.21	16.90	ND	20.31	08-07-97	<250	<2.5	<2.5	<2.5	<2.5	250	--	--	--		
MW-5	11-10-97	37.21	16.88	ND	20.33	11-10-97	<1,000	<10	<10	<10	<10	770	--	--	--		
MW-5	02-16-98	37.21	10.56	ND	26.65	02-16-98	<200	<2	<2	<2	<2	230	--	--	--		
MW-5	04-15-98	37.21	12.20	ND	25.01	04-15-98	<500	<5	<5	<5	<5	900	--	--	--		
MW-5	07-24-98	37.21	14.20	ND	23.01	07-24-98	<500	<5	<5	<5	<5	570	--	--	--		
MW-5	10-19-98	37.21	15.74	ND	21.47	10-19-98	<250	<2.5	<2.5	<2.5	<2.5	300	--	--	--		
MW-5	01-28-99	37.21	14.60	ND	22.61	01-28-99	<500	8	<5	<5	<5	290	--	--	--		
MW-5	06-25-99	37.21	15.10	ND	22.11	06-25-99	<50	<0.5	<0.5	<0.5	<0.5	1,300	--	--	--	0.76	NP
MW-5	08-25-99	37.21	15.91	ND	21.30	08-25-99	<50	<0.5	<0.5	<0.5	<0.5	6,700	--	--	--	0.98	NP
MW-5	11-10-99	37.21	15.52	ND	21.69	11-10-99	130	2.0	7.0	1.3	21	5,000	--	--	--	0.21	NP
MW-5	02-09-00	37.21	14.03	ND	23.18	02-09-00	92	<0.5	0.8	<0.5	1.0	7,900	--	--	--	0.51	NP
MW-6	03-21-96	37.11	11.55	ND	25.56	03-22-96	<50	<0.5	1.9	<0.5	<0.5	<3	--	--	--		
MW-6	05-24-96	37.11	12.80	ND	24.31	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	6	--	--	--		

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Free Product Thickness feet	Groundwater Elevation ft-MSL	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8021B* µg/L	Toluene EPA 8021B* µg/L	Ethylbenzene EPA 8021B* µg/L	Total Xylenes EPA 8021B* µg/L	MTBE EPA 8021B* µg/L	MTBE EPA 8260 µg/L	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L	Dissolved Oxygen mg/L	Purged/ Not Purged P/NP
MW-6	08-09-96	37.11	Not surveyed			08-09-96	Not sampled: Car parked on well										
MW-6	11-06-96	37.11	Not surveyed			11-06-96	Not sampled: Car parked on well										
MW-6	03-24-97	37.11	13.06	ND	24.05	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	05-27-97	37.11	14.30	ND	22.81	05-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	08-07-97	37.11	16.40	ND	20.71	08-07-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	11-10-97	37.11	16.53	ND	20.58	11-10-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	02-16-98	37.11	Not surveyed			02-16-98	Not sampled: Car parked on well										
MW-6	04-15-98	37.11	10.95	ND	26.16	04-15-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	07-24-98	37.11	13.30	ND	23.81	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	10-19-98	37.11	Not surveyed			10-19-98	Not sampled: Car parked on well										
MW-6	01-28-99	37.11	13.92	ND	23.19	01-28-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	06-25-99	37.11	15.47	ND	21.64	06-25-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	0.74	NP
MW-6	08-25-99	37.11	15.39	ND	21.72	08-25-99	<50	<0.5	3.4	0.6	3.7	<3	--	--	--	0.92	NP
MW-6	11-10-99	37.11	14.92	ND	22.19	11-10-99	<50	<0.5	<0.5	<0.5	<1	<3	--	--	--	0.31	NP
MW-6	02-09-00	37.11	13.30	ND	23.81	02-09-00	<50	<0.5	0.9	<0.5	1.3	<3	--	--	--	0.79	NP
MW-7	03-21-96	38.68	13.32	ND	25.36	03-22-96	32,000	870	450	970	4,900	280	--	--	--		
MW-7	05-24-96	38.68	14.58	ND	24.10	05-24-96	22,000	570	40	42	1,900	<200[2]	--	--	--		
MW-7	08-09-96	38.68	15.33	ND	23.35	08-09-96	14,000	390	<10	180	470	<200[2]	--	--	--		
MW-7	11-06-96	38.68	16.95	ND	21.73	11-06-96	9,500	440	<10	210	150	<100[2]	--	--	--		
MW-7	03-24-97	38.68	14.65	ND	24.03	03-24-97	6,400	420	<10	260	13	480	--	--	--		
MW-7	05-27-97	38.68	15.58	ND	23.10	05-28-97	5,000	420	<5	230	10	460	--	--	--		
MW-7	08-07-97	38.68	17.10	ND	21.58	08-07-97	3,900	350	<5	200	10	330	--	--	--		
MW-7	11-10-97	38.68	18.05	ND	20.63	11-10-97	5,600	590	10	370	43	540	--	--	--		
MW-7	02-16-98	38.68	12.03	ND	26.65	02-16-98	<5,000	390	<50	<50	61	4,300	--	--	--		

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Free Product Thickness feet	Groundwater Elevation ft-MSL	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8021B* µg/L	Toluene EPA 8021B* µg/L	Ethylbenzene EPA 8021B* µg/L	Total Xylenes EPA 8021B* µg/L	MTBE EPA 8021B* µg/L	MTBE EPA 8260 µg/L	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L	Dissolved Oxygen mg/L	Purged/ Not Purged P/NP
MW-7	04-15-98	38.68	13.02	ND	25.66	04-15-98	<10,000	<100	<100	<100	<100	8,900	--	--	--		
MW-7	07-24-98	38.68	14.18	ND	24.50	07-24-98	5,800	180	<50	74	<50	4,200	--	--	--		
MW-7	10-19-98	38.68	15.99	ND	22.69	10-19-98	<2,500	54	<25	72	<25	3,000	--	--	--		
MW-7	01-28-99	38.68	15.69	ND	22.99	01-28-99	4,500	560	250	<50	94	6,200	--	--	--		
MW-7	06-25-99	38.68	15.36	ND	23.32	06-25-99	3,900	520	160	46	100	45,000	63,000[3]	--	--	0.56	NP
MW-7	08-25-99	38.68	16.71	ND	21.97	08-25-99	3,400	730	77	51	110	62,000	76,000[3]	--	--	0.90	NP
MW-7	11-10-99	38.68	16.76	ND	21.92	11-10-99	15,000	340	19	13	20	55,000	91,000[3]	--	--	0.37	NP
MW-7	02-09-00	38.68	14.45	0.03	24.25 [1]	02-09-00	Not sampled: free product present										

ft-MSL: elevation in feet, relative to mean sea level
TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
MTBE: Methyl tert-butyl ether
TRPH: total recoverable petroleum hydrocarbons
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
*: EPA method 8020 prior to 11/10/99
EPA: United States Environmental Protection Agency
µg/L: micrograms per liter
mg/L: milligrams per liter
ND: none detected
- -: not available or not analyzed
<: less than laboratory detection limit stated to the right
[1]: [corrected elevation (Z')] = Z + (h * 0.73) where: Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water
[2]: chromatogram fingerprint is not characteristic of diesel
[3]: also analyzed for fuel oxygenates
[4]: this value is suspected to be erroneous based on subsequent check by bailer (following day). See discussion

Table 3
Recent Groundwater Elevation and Analytical Data

ARCO Service Station # 2111
1156 Davis Street
San Leandro, California

Well Number	Date Sampled		Top of Riser Elevation (feet, MSL)	Depth to Groundwater (feet, TOC)	Groundwater Elevation (feet, MSL)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (8020) (µg/L)	MTBE (8260) (µg/L)	Dissolved Oxygen (mg/L)
MW-1	06/26/00		39.60	16.46	23.14	NA	NA	NA	NA	NA	NA	NA	NA
	07/20/00			16.89	22.71	360	110	<0.5	<0.5	2.7	2,100	NA	NA
	09/19/00			17.62	21.98	290	76	<0.5	<0.5	2.3	1,500	NA	NA
	12/21/00			17.39	22.21	257	64	2.89	1.31	4.57	1,080	1,060	NA
	03/13/01			15.7	23.90	<500	52.5	<5.0	<5.0	<5.0	1,430	1,370	NA
	09/18/01			18.24	21.36	<500	64	7.3	<5.0	52	810	1,100	NA
	12/28/01			15.95	23.65	<500	<5.0	<5.0	5.00	22	1,200	1,100	NA
	03/14/02			16.01	23.59	<50	<0.5	<0.5	<0.5	<0.5	34	40	NA
	04/23/02			15.43	24.17	<50	<0.5	<0.5	<0.5	<0.5	30	NA	NA
	07/17/02	NP		17.50	22.10	<50	1.2	<0.50	<0.50	<0.50	29	NA	1.6
	10/09/02			18.27	21.33	240[c]	4.9	<1.0	4.1	7.0	290	310	1.2
	01/13/03			15.37	24.23	760 [c]	34	11	17	56	300	NA	1.0
	04/07/03 [n]			16.61	22.99	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	NA	22	1.5
MW-2	06/26/00		37.99	14.60	23.39[a]	NA	NA	NA	NA	NA	NA	NA	NA
	07/20/00			15.14	22.85	95,000	2,300	18,000	2,500	19,000	13,000	NA	NA
	09/19/00			15.95	22.04	63,000	1,200	6,300	2,000	14,000	19,000	NA	NA
	12/21/00			15.60	22.39	45,900		2,130	1,160	9,460	22,400	24,700	NA
	12/21/00[b]			NM	NC	5,010	360	189	213	626	54,300	89,200	NA
	03/13/01			13.77	23.9	3,650	98.1	<5.0	<5.0	6.42	3,590	3,260	NA
	3/13/2001[b]			NM	NC	<20,000	525	466	408	1,460	91,700	76,000	NA
	9/18/2001[a]			16.86	21.13	NS	NS	NS	NS	NS	NS	NS	NA
	12/28/01			14.28	23.71	31,000	1,500	3,800	1,300	4,800	9,300	8,800	NA
	03/14/02			14.15	23.84	1,800	25	43	43	270	990	960	NA
	04/23/02			13.60	24.39	9,000	220	110	470	2,500	8,500	NA	NA
	07/17/02	NP	SHEEN	15.75	22.24	74,000 [c]	280	290	820	10,000	19,000	NA	0.4
	10/9/02 [g]	NP		16.69	21.30	NS	NS	NS	NS	NS	NS	NS	NA
	01/13/03 [g]		FREE PRODUCT	13.59	24.61 [h]	NS	NS	NS	NS	NS	NS	NA	NA
	04/07/03 [g]		FREE PRODUCT	14.70	23.69 [h]	NS	NS	NS	NS	NS	NA	NS	NA

Table 3
Recent Groundwater Elevation and Analytical Data

ARCO Service Station # 2111
1156 Davis Street
San Leandro, California

Well Number	Date Sampled		Top of Riser Elevation (feet, MSL)	Depth to Groundwater (feet, TOC)	Groundwater Elevation (feet, MSL)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (8020) (µg/L)	MTBE (8260) (µg/L)	Dissolved Oxygen (mg/L)
MW-3	06/26/00		39.32	15.96	23.36	NA	NA	NA	NA	NA	NA	NA	NA
	07/20/00			16.42	22.90	<50	<0.5	<0.5	<0.5	<1.0	130	NA	NA
	09/19/00			17.18	22.14	190	17	<0.5	1.4	2.4	160	NA	NA
	12/21/00			16.97	22.35	187	17.8	<0.5	2.47	2.5	143	125	NA
	03/13/01			15.17	24.15	72.4	2.83	<0.5	<0.5	<0.5	126	122	NA
	09/18/01			17.81	21.51	140	6.4	<0.5	3.5	1.6	110	75	NA
	12/28/01			15.44	23.88	130	5.9	<0.5	0.99	0.55	90	63	NA
	03/14/02			15.50	23.82	<50	<0.5	<0.5	<0.5	<0.5	100	88	NA
	04/23/02			14.96	24.36	<50	<0.5	<0.5	<0.5	<0.5	77	NA	NA
	07/17/02	NP		17.09	22.23	<50	<0.50	<0.50	<0.50	<0.50	47	NA	0.8
	10/09/02	NP		17.87	21.45	<50	<0.50	<0.50	<0.50	<0.50	26	29	1.3
	01/13/03	NP		14.78	24.54	ND<50	ND<0.50	ND<0.50 [l]	ND<0.50	ND<0.50	59 [m]	NA	0.8
	04/07/03 [n]	NP		16.15	23.17	88	ND<0.50	ND<0.50	ND<0.50	ND<0.50	NA	75	1.1
MW-4	06/26/00		38.10	14.59	23.51	NA	NA	NA	NA	NA	NA	NA	NA
	07/20/00			15.04	23.06	97	7.9	<0.5	<0.5	1.1	51	NA	NA
	09/19/00			15.83	22.27	110	7.0	<0.5	<0.5	<1.0	60	NA	NA
	12/21/00			15.59	22.51	120	5.6	<0.5	1.72	<0.5	46.3	48.6	NA
	03/13/01			13.73	24.37	76	0.796	<0.5	<0.5	<0.5	53.7	50.0	NA
	09/18/01			16.50	21.60	<50	<0.5	<0.5	<0.5	<0.5	25	26.0	NA
	12/28/01			14.03	24.07	<50	<0.5	<0.5	<0.5	<0.5	15	11.0	NA
	03/14/02			14.10	24.00	<50	<0.5	<0.5	<0.5	<0.5	31	28	NA
	04/23/02			13.57	24.53	<50	3	<0.5	<0.5	<0.5	42	NA	NA
	07/17/02	NP		15.76	22.34	<50	<0.50	<0.50	<0.50	<0.50	16	NA	1.2
	10/09/02	NP		16.59	21.51	<50	2.2	<0.50	<0.50	<0.50	20	23	0.8
	01/13/03	NP		13.43	24.67	52 [d]	ND<0.50	1.6	ND<0.50	ND<0.50	22	NA	0.6
	04/07/03 [n]	NP		14.74	23.36	65	ND<0.50	ND<0.50	ND<0.50	ND<0.50	NA	24	0.7

Table 3
Recent Groundwater Elevation and Analytical Data

ARCO Service Station # 2111
1156 Davis Street
San Leandro, California

Well Number	Date Sampled		Top of Riser Elevation (feet, MSL)	Depth to Groundwater (feet, TOC)	Groundwater Elevation (feet, MSL)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (8020) (µg/L)	MTBE (8260) (µg/L)	Dissolved Oxygen (mg/L)
MW-5	06/26/00		37.21	14.27	22.94	NA	NA	NA	NA	NA	NA	NA	NA
	07/20/00			14.69	22.52	55	<0.5	<0.5	<0.5	<1.0	14,000	NA	NA
	09/19/00			15.36	21.85	54	<0.5	<0.5	<0.5	<1.0	13,000	NA	NA
	12/21/00			15.15	22.06	72.9	2.51	<0.5	<0.5	0.961	19,200	21,200	NA
	03/13/01			13.5	23.71	<500	<5	<5	<5	<5	15,900	20,000	NA
	09/18/01			15.94	21.27	<10,000	<100	<100	<100	<1,000	22,000	20,000	NA
	12/28/01			13.45	23.76	<10,000	<100	<100	<100	<100	10,000	10,000	NA
	03/14/02			13.82	23.39	<5,000	<50	<50	<50	<50	7,100	7,700	NA
	04/23/02			13.25	23.96	<5,000	<50	<50	<50	<50	8,900	NA	NA
	07/17/02	NP		15.27	21.94	7,900 [d]	<50	<50	<50	<50	13,000	NA	1.1
	10/09/02	NP		16.02	21.19	2,400[e]	<20	<20	<20	<20	7,300	7,500	1.2
	01/13/03	NP		13.20	24.01	6,400 [e]	ND<50 [j]	ND<50	ND<50	ND<50 [j]	8,900 [k]	NA	1.3
	04/07/03 [n]	NP		14.42	22.79	ND<10,000	ND<100	ND<100	ND<100	ND<100	NA	3,700	0.9
MW-6	06/26/00		37.11	13.46	23.65	NA	NA	NA	NA	NA	NA	NA	NA
	07/20/00			13.94	23.17	<50	<0.5	<0.5	<0.5	<1.0	<3.0	NA	NA
	09/19/00			14.41	22.70	<50	<0.5	<0.5	<0.5	<1.0	<3.0	NA	NA
	12/21/00			14.53	22.58	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NA
	03/13/01			12.67	24.44	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NA
	09/18/01			15.42	21.69	<50	<0.5	<0.5	<0.5	<0.5	<2.5	<2.0	NA
	12/28/01			12.96	24.15	<50	<0.5	<0.5	<0.5	<0.5	12	<0.5	NA
	03/14/02			12.98	24.13	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NA
	04/23/02			12.44	24.67	<50	<0.5	<0.5	<0.5	<0.5	3	NA	NA
	07/17/02	NP		14.65	22.46	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA	1.3
	10/09/02	NP		15.51	21.60	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA	1.3
	01/13/03	NP		12.27	24.84	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5	NA	1.1
	04/07/03 [n]	NP		13.61	23.50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	NA	ND<0.50	2.0

Table 3
Recent Groundwater Elevation and Analytical Data

ARCO Service Station # 2111
1156 Davis Street
San Leandro, California

Well Number	Date Sampled		Top of Riser Elevation (feet, MSL)	Depth to Groundwater (feet, TOC)	Groundwater Elevation (feet, MSL)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (8020) (µg/L)	MTBE (8260) (µg/L)	Dissolved Oxygen (mg/L)
MW-7	06/26/00		38.68	14.34	24.34	NA	NA	NA	NA	NA	NA	NA	NA
	07/20/00			15.26	23.42	14,000	5.4	<0.5	2.8	5.9	71,000	NA	NA
	09/19/00			15.70	22.98	8,400	420	38	470	220	5,600	NA	NA
	12/21/00			16.02	22.66	NS[a]	NS[a]	NS[a]	NS[a]	NS[a]	NS[a]	NS[a]	NA
	03/13/01			14.18	24.50	<2,000	154	63	46.3	127	175,000	160,000	NA
	09/18/01			17.02	21.66	<100,000	1,900	<1,000	<1,000	2,800	190,000	370,000	NA
	12/28/01			14.81	23.87	<20,000	<200	<200	<200	<200	84,000	72,000	NA
	03/14/02			14.60	24.08	<50,000	<500	<500	<500	<500	85,000	85,000	NA
	04/23/02			13.94	24.74	<20,000	530	200	220	800	67,000	NA	NA
	07/17/02	NP		16.27	22.41	26,000 [d]	720	<250	<250	860	120,000	NA	1.0
	10/09/02	NP		17.16	21.52	110,000[d]	1,500	4,400	820	5,400	97,000	120,000	0.9
	01/13/03	NP		13.82	24.86	ND<50,000 [f]	ND<500 [f]	ND<500 [f]	ND<500 [f]	2,200 [f]	33,000 [f]	NA	0.8
	04/07/03 [n]	NP		14.52	24.16	ND<2,500	30	ND<25	ND<25	ND<25	NA	710	1.0

Table 3
Recent Groundwater Elevation and Analytical Data

ARCO Service Station # 2111
1156 Davis Street
San Leandro, California

Well Number	Date Sampled	Top of Riser Elevation (feet, MSL)	Depth to Groundwater (feet, TOC)	Groundwater Elevation (feet, MSL)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (8020) (µg/L)	MTBE (8260) (µg/L)	Dissolved Oxygen (mg/L)

Notes:

TPH	= Total Petroleum Hydrocarbons analyzed by EPA method 8260B. (Prior to 04/07/03, analyzed by EPA method 8015 modified.)
BTEX	= Benzene, Toluene, Ethyl-benzene, and Total Xylenes analyzed by EPA method 8260B. (Prior to 04/07/03, analyzed by EPA method 8021B.)
MTBE	= Methyl tertiary butyl ether analyzed by EPA Method 8260B. (Prior to 04/07/03, analyzed by EPA method 8021B unless otherwise noted.)
µg/L	= Micrograms per liter
mg/L	= Milligrams per liter
NA	= Not available
NM	= Not measured
NC	= Not calculated
NP	= Well not purged before sampling
MSL	= Mean sea level
TOC	= Top of casing
ND<	= Not detected at or above specified laboratory method detection limit
a	= Product sheen noted
b	= Well was sampled after batch extraction event.
c	= Chromatogram Pattern: Gasoline C6-C10
d	= Hydrocarbon pattern is present in the requested fuel quantitation range but does not resemble the pattern of the requested fuel
e	= Discrete peak @C6-C7
f	= This sample was analyzed beyond the EPA recommended holding time. The results may still be useful for their intended purpose.
g	= Well not sampled due to the detection of free product.
h	= Groundwater elevation adjusted for free product: (thickness of free product x 0.8) + measured groundwater elevation
j	= The closing calibration was outside acceptance limits by 1%. This should be considered in evaluating the result. The average % difference for all analytes met the 15% requirement and the QC suggests that calibration linearity is not a factor.
k	= The closing calibration was outside acceptance limits by 6%. This should be considered in evaluating the result. The average % difference for all analytes met the 15% requirement and the QC suggests that calibration linearity is not a factor.
l	= This analyse was not confirmed using a secondary column in accordance to client contract.
m	= This analyze was not confirmed using a secondary column in accordance to client contract.
n	= TPH-g, BTEX, and MTBE analyzed by EPA method 8260B beginning on the second quarter 2003 sampling event (04/07/03).
Source :	The data within this table collected prior to July 2002 was provided to URS by Group Environmental Management Company and their previous consultants. URS has not verified the accuracy of this information.

Table 4

Groundwater Flow Direction and Gradient

ARCO Service Station # 2111
1156 Davis Street
San Leandro, California

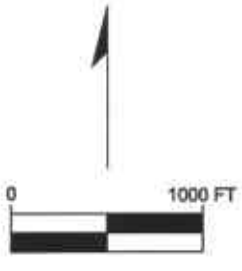
Date Measured	Average Flow Direction	Average Hydraulic Gradient
07/20/00	West-Northwest	0.006
09/19/00	West-Northwest	0.004
12/21/00	West-Northwest	0.004
03/13/01	West-Northwest	0.005
05/30/01	West-Northwest	0.004
09/18/01	West-Northwest	0.003
12/28/01	West-Northwest	0.003
03/14/02	West	0.004
04/23/02	West	0.006
07/17/02	West	0.003
10/09/02	West	0.002
01/13/03	Southwest	0.004
04/07/03	Northwest	0.009

Note: The data within this table collected prior to July 2002 was provided to URS by Group Environmental Management Company and their previous consultants. URS has not verified the accuracy of this information.

REFERENCE:
BASE MAP FROM TOPO MAP
NORTH REGION 7

7.5 MINUTE TOPOGRAPHIC
PHOTOREVISED 1998

QUADRANGLE LOCATION

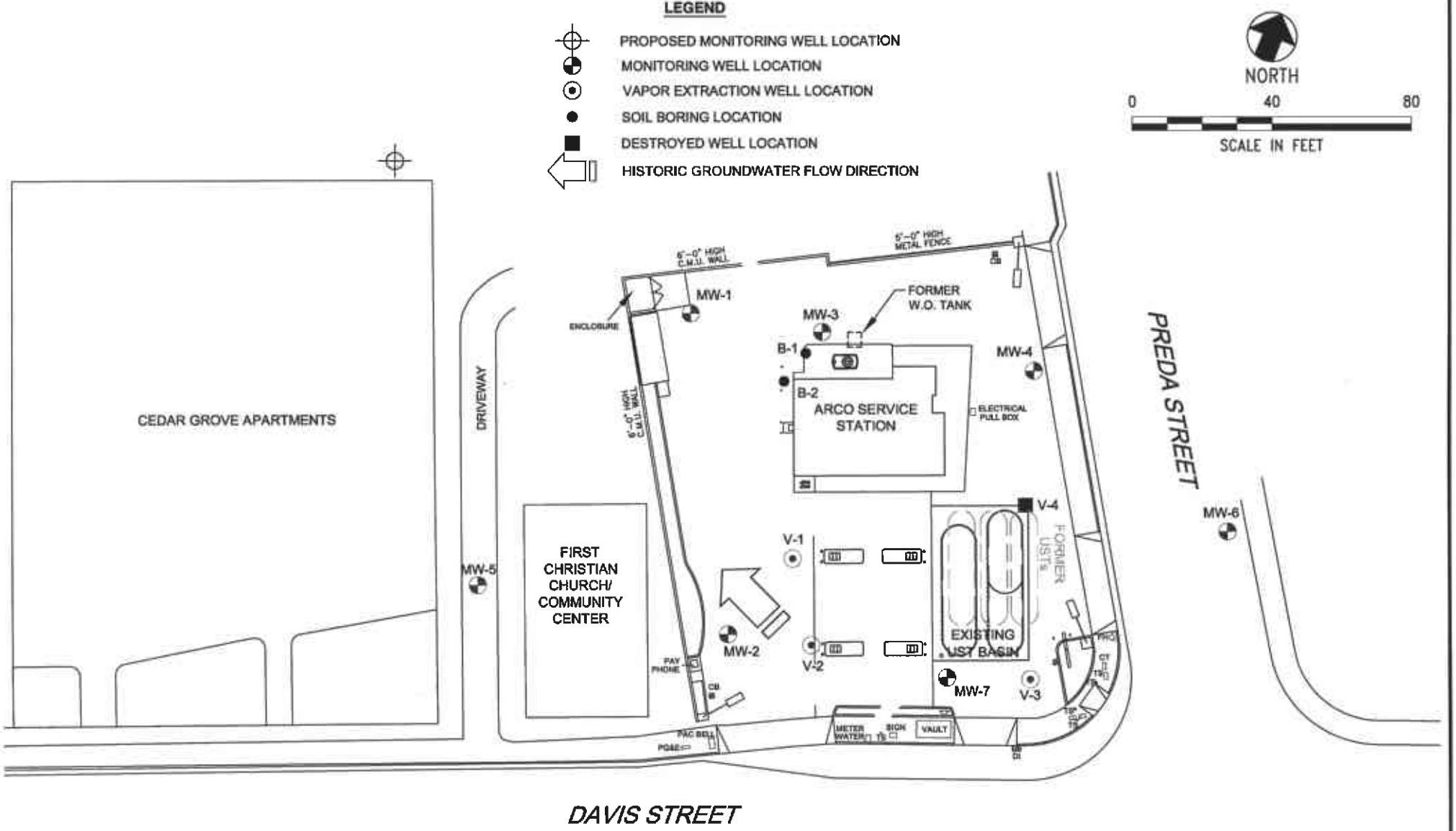


APPROXIMATE SCALE

URS	Project No. 38486093 Arco Service Station #2153 1156 Davis Street San Leandro, California	SITE LOCATION MAP	FIGURE 1

X:\x_env\waste\BP GEM\Sites\Scott Robinson\Paul Supple\2111\RAP\SLM.dwg

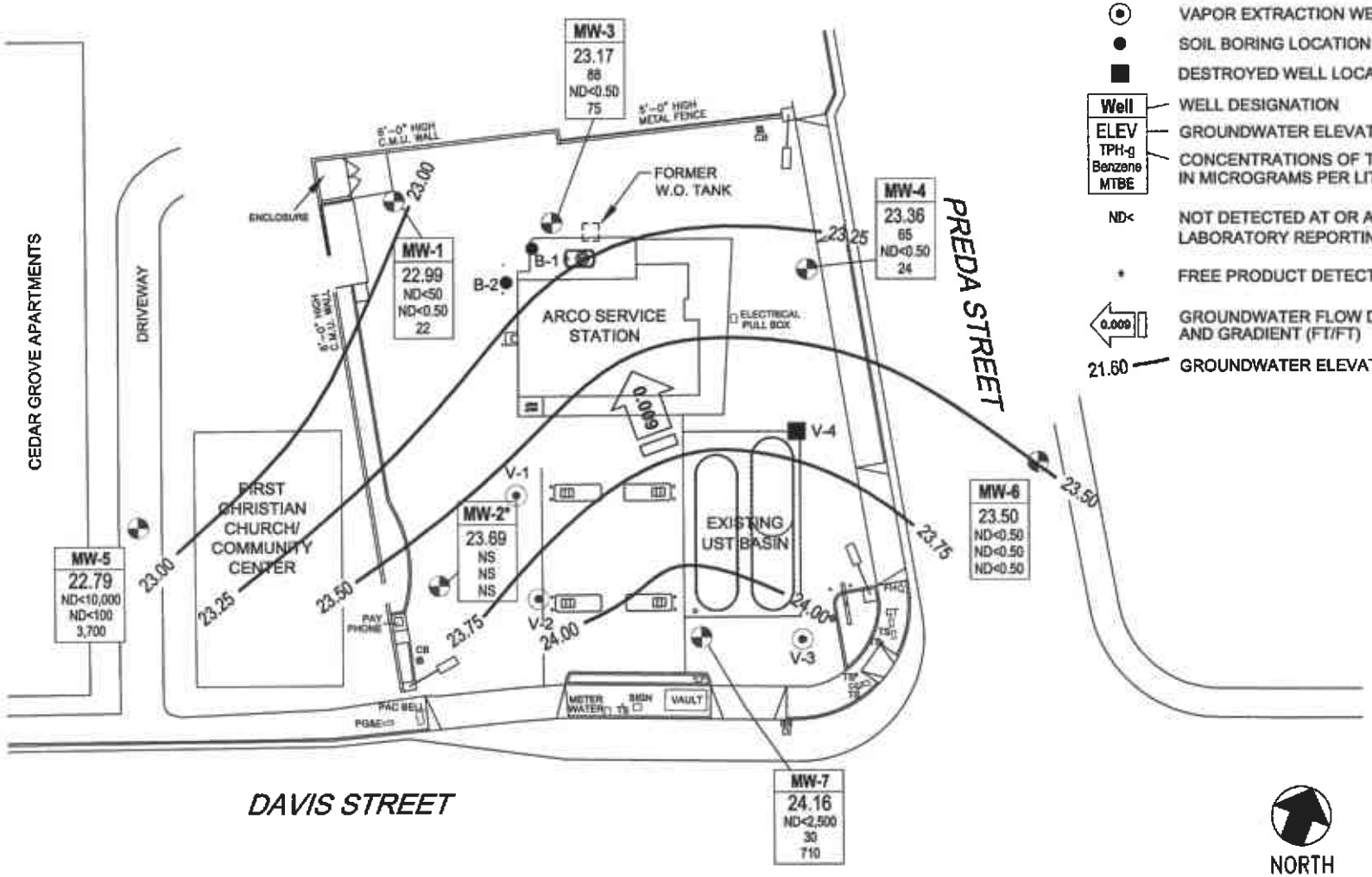
X:\x_env\waste\BP GEM\Sites\Scott Robinson\Paul Supple\2111\RAP\2_SP.dwg



NOTE: SITE MAP ADAPTED FROM DELTA ENVIRONMENTAL FIGURES.
SITE DIMESIONS AND FACILITY LOCATIONS NOT VERIFIED.

URS	Project No. 38486093 Arco Service Station #2111 1156 Davis Street San Leandro, California	SITE PLAN	FIGURE 2

X:\x_env\waste\BP GEM\Sites\Scott Robinson\Paul Supple\2111\RAP\Drawings\3_GWEC-AS_4-7.dwg



LEGEND

- MONITORING WELL LOCATION
- VAPOR EXTRACTION WELL LOCATION
- SOIL BORING LOCATION
- DESTROYED WELL LOCATION
- Well — WELL DESIGNATION
- ELEV — GROUNDWATER ELEVATION (FT/MSL)
- TPH-g, Benzene, MTBE — CONCENTRATIONS OF TPH-g, BENZENE & MTBE IN MICROGRAMS PER LITER (µg/L)
- ND< — NOT DETECTED AT OR ABOVE LABORATORY REPORTING LIMIT
- * — FREE PRODUCT DETECTED, WELL NOT SAMPLED
- 0.009 — GROUNDWATER FLOW DIRECTION AND GRADIENT (FT/FT)
- 21.60 — GROUNDWATER ELEVATION CONTOUR (FT/MSL)

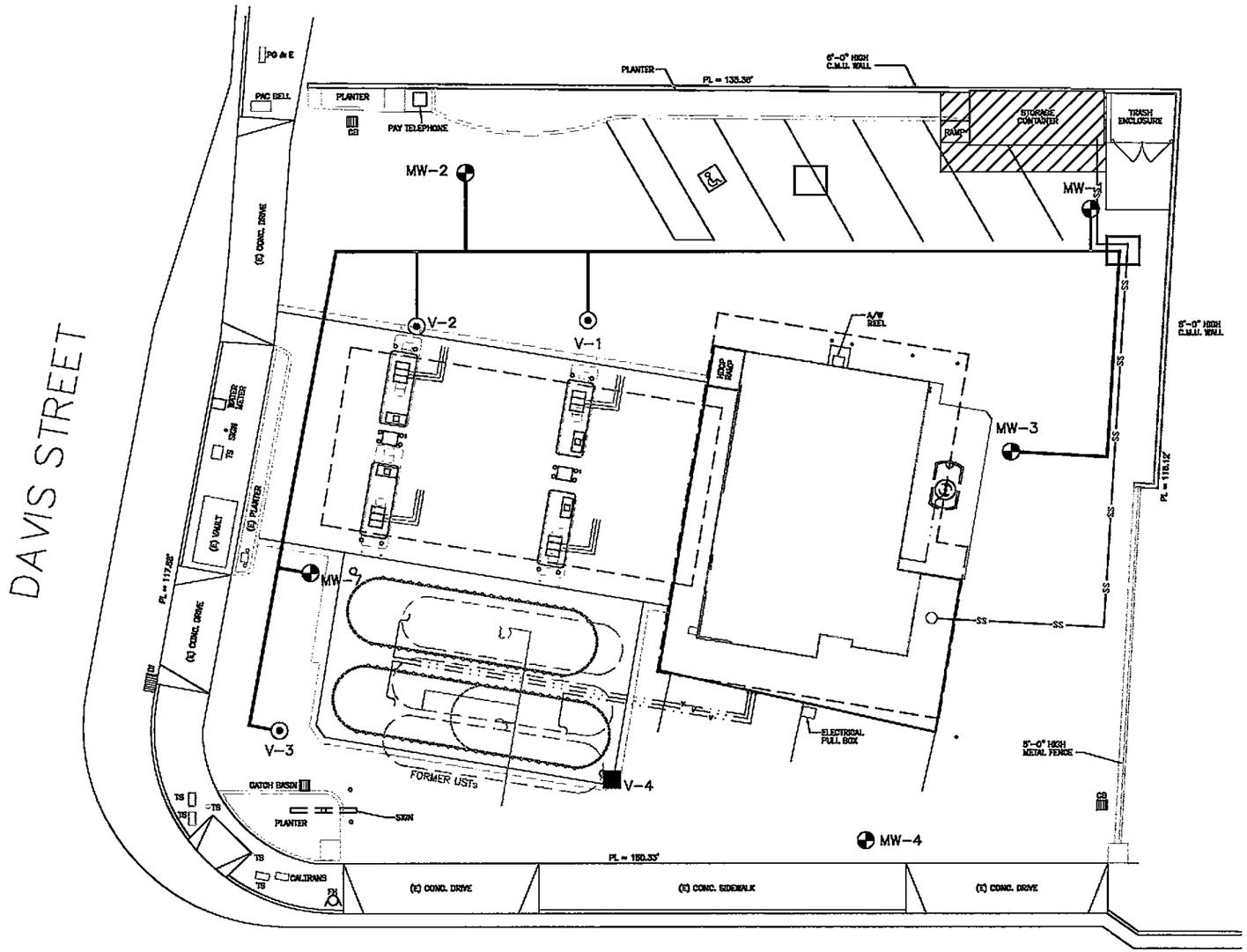
NORTH

0 40 80

SCALE IN FEET

NOTE: SITE MAP ADAPTED FROM DELTA ENVIRONMENTAL FIGURES. SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.

URS	Project No. 38486093 Arco Service Station #2111 1156 Davis Street San Leandro, California	GROUNDWATER ELEVATION CONTOUR AND ANALYTICAL SUMMARY MAP Second Quarter 2003 (April 7, 2003)	FIGURE 3



LEGEND:

- MONITORING WELL
- VAPOR EXTRACTION WELL
- DESTROYED WELL
- STORM SEWER DISCHARGE
- REMEDIATION PIPING
- PROPOSED TREATMENT COMPOUND

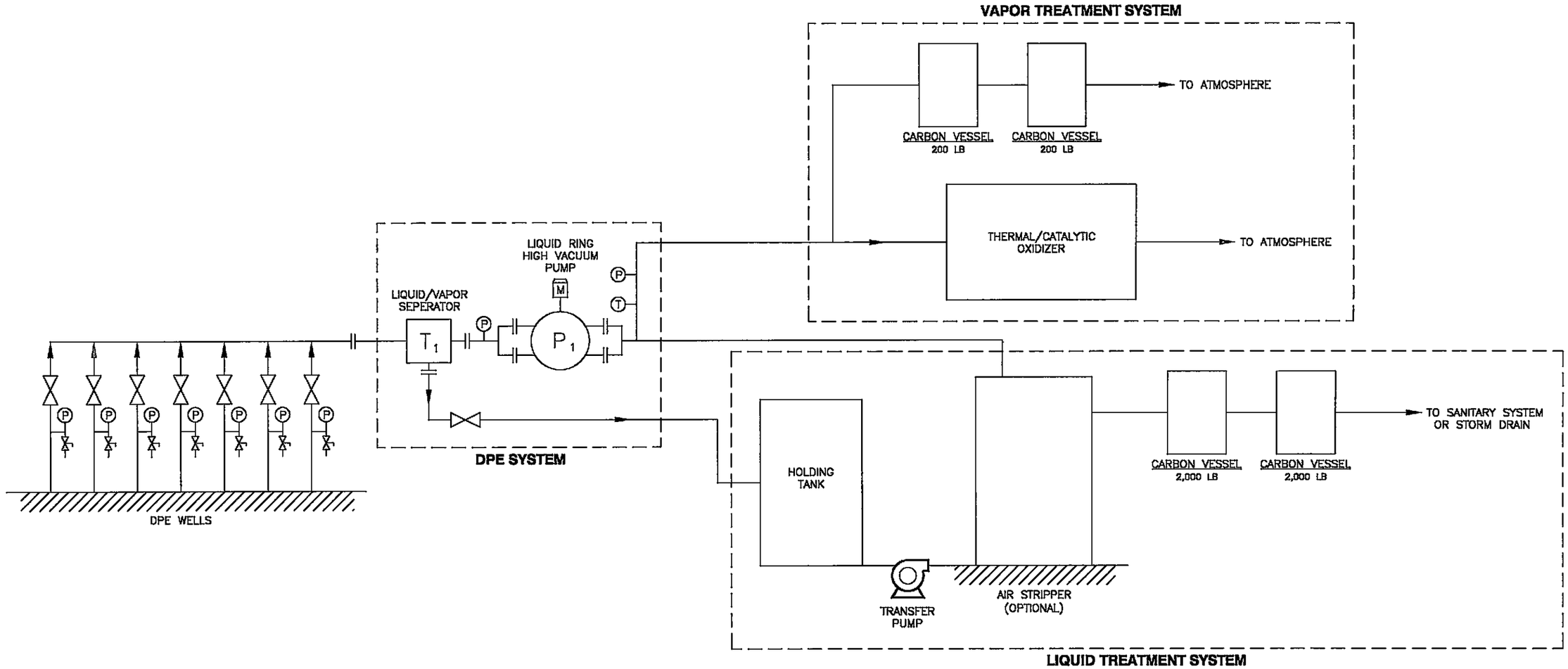
N

0 10 20 40

Scale (ft)

URS	Project No. 38486297 Arco Facility No. 2111 1156 Davis Street San Leandro, California	DPE CONVEYANCE PIPING AND EXTRACTION WELL LOCATIONS	FIGURE 4

X:\x_env\waste\BP GEM\Sites\Scott Robinson\Paul Supple\2111RAP\Drawings\4_DPE-CW-EWL.dwg



NOT DRAWN TO SCALE

X:\x_env\waste\BP GEM\Sites\Scott Robinson\Paul Supple\2111\RAP\Drawings\8_Prop-DPE.dwg

URS	Project No. 38486297 Arco Facility No. 2111 1156 Davis Street San Leandro, California	PROPOSED DPE SYSTEM LAYOUT	FIGURE 5

Appendix A

Alameda County Health Care Services Agency - April 25, 2003

RO0000494

April 25, 2003

Mr. Paul Supple
ARCO Products Company
P.O. Box 6549
Moraga, CA 94570

RE: Migration Control at ARCO Station 2111 at 1156 Davis St, San Leandro, CA

Dear Mr. Supple:

Alameda County Environmental Health staff has completed review of the case file for the above referenced site. We are very concerned with the high levels of petroleum hydrocarbons, including benzene and MTBE at and downgradient from your site. In October 2002, a Corrective Action Plan prepared for the site, concluded that natural attenuation would be the most cost-effective approach to remediate the contaminant plume. Presently, groundwater from well MW-2 contains free phase hydrocarbon, and well MW-7 contains 110,000 ppb TPHg, 1,500 ppb benzene, and 120,000 ppb MTBE. The contaminant plume does not appear stable and continues to migrate offsite. The extent of the plume has not been delineated.

This agency does not concur that natural attenuation should be the only remedial alternative for the site. At this time, you must implement migration control to prevent continued creation of a dissolved contaminant plume. It is recommended that dual phase extraction, that was demonstrated in a 78 hour pilot test to be an effective solution in the long term to remediate the site, be used to control migration of BTEX and MTBE. Please outline your proposal for migration control in a Remedial Action Work Plan. The work plan is due within 45 days of the date of this letter, **or by June 20, 2003.** The work plan should include a proposal to delineate the extent of the plume, too.

If you have any questions, I can be reached at (510) 567-6762 or by email at echu@co.alameda.ca.us.

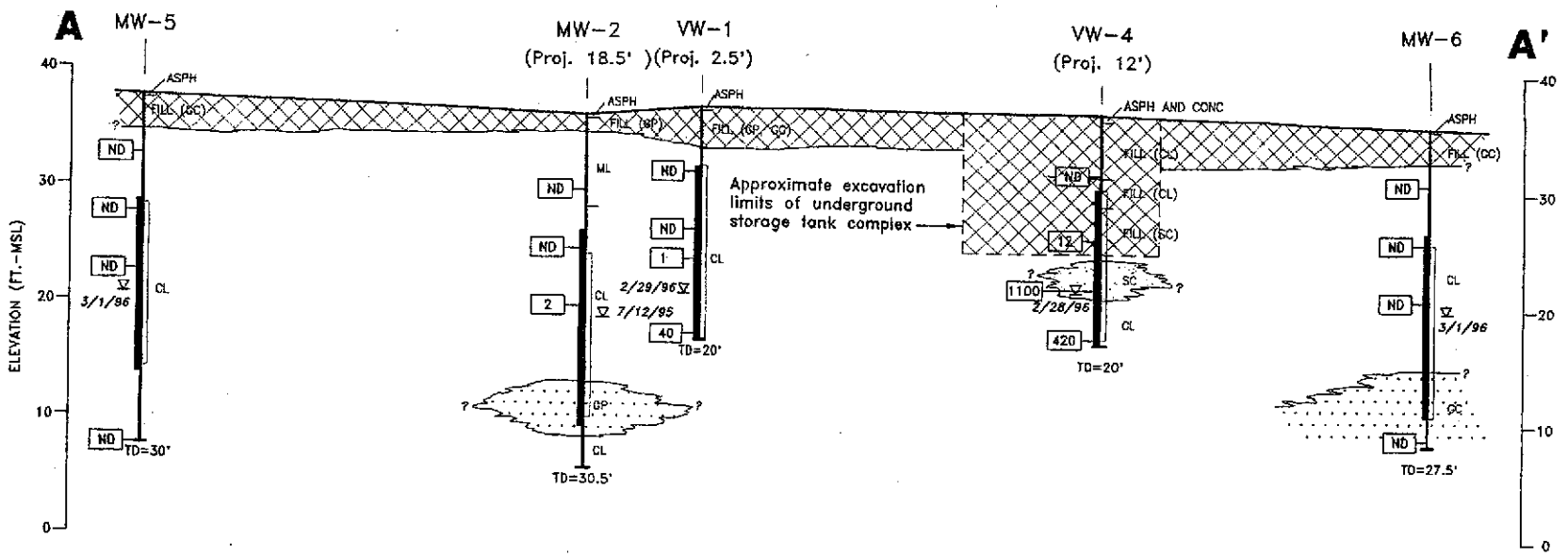
eva chu
Hazardous Materials Specialist

c: Donna Drogos

arco2111-1

Appendix B

Geologic Cross Sections and Boring Logs



EXPLANATION

- FILL
- SILTS AND CLAYS (ML, CL)
- SANDS, SILTY AND CLAYEY SANDS (SP, SM, SC)
- GRAVELS, SILTY AND CLAYEY GRAVELS (GP, GM, GC)
- Geologic contact; dashed where approximate, queried where uncertain

VW-4 Well/boring designation

- Borehole
- <1.0 TPH as gasoline (ppm)
- Sand pack interval
- First encountered groundwater (showing date measured)
- Screened interval
- TD=23.5' Total depth of boring

NOTES:

1. See Figure 2 for location of cross section.
2. See Appendix F for soil symbol explanation.

EMCON

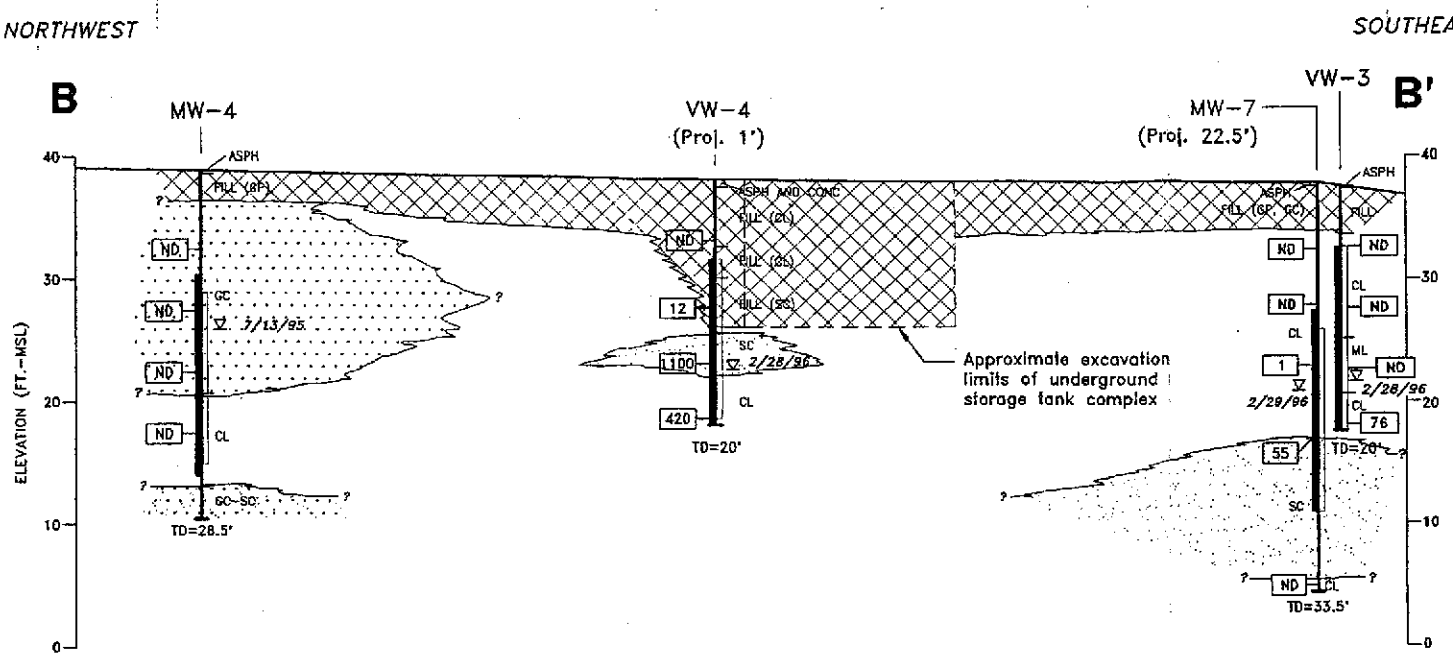
SCALE: 0 20 40 FEET (Horizontal)

ARCO PRODUCTS COMPANY
SERVICE STATION 2111, 1156 DAVIS STREET
SOIL AND GROUNDWATER ASSESSMENT
SAN LEANDRO, CALIFORNIA

GEOLOGIC CROSS SECTION A-A'

FIGURE NO. 3

PROJECT NO. 805-127.001



EXPLANATION

- FILL
- SILTS AND CLAYS (ML, CL)
- SANDS, SILTY AND CLAYEY SANDS (SP, SM, SC)
- GRAVELS, SILTY AND CLAYEY GRAVELS (GP, GM, GC)
- Geologic contact; dashed where approximate, queried where uncertain

VW-4 Well/boring designation

- Borehole
- <1.0 TPH as gasoline (ppm)
- Sand pack interval
- First encountered groundwater (showing date measured)
- Screened interval
- TD=23.5' Total depth of boring

NOTES:

1. See Figure 2 for location of cross section.
2. See Appendix F for soil symbol explanation.

emcon

SCALE: 0 10 20 FEET
(Horizontal)

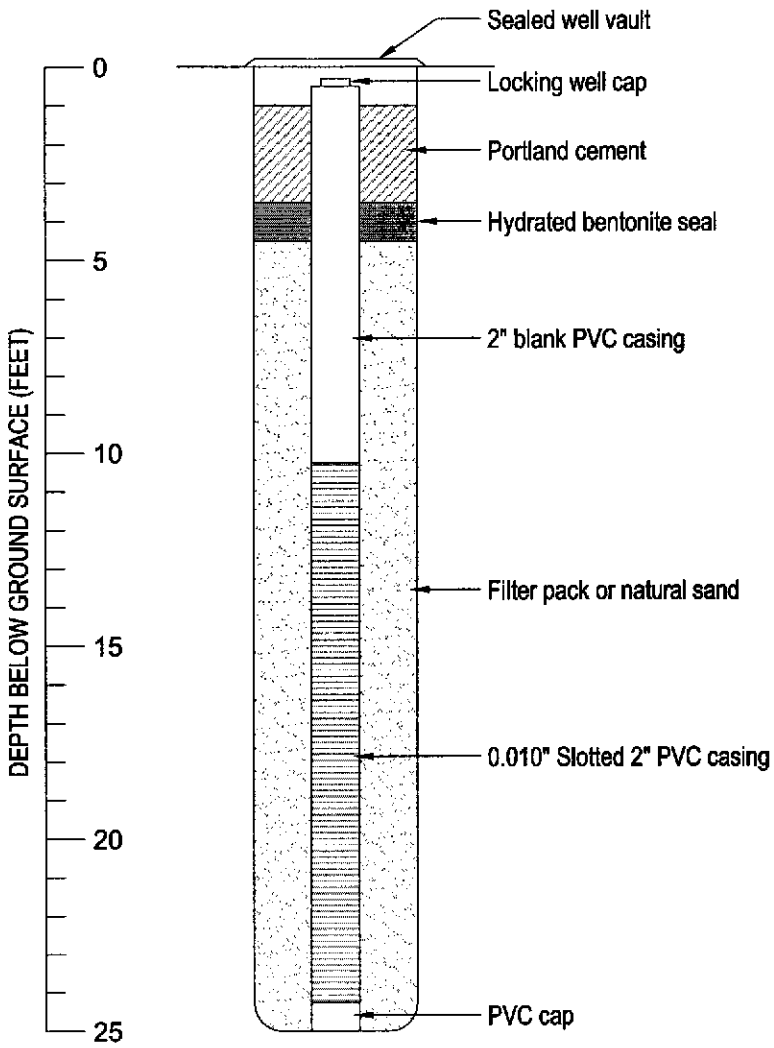
ARCO PRODUCTS COMPANY
SERVICE STATION 2111, 1156 DAVIS STREET
SOIL AND GROUNDWATER ASSESSMENT
OAKLAND, CALIFORNIA

GEOLOGIC CROSS SECTION B-B'

FIGURE NO.
4
PROJECT NO.
805-127.001

Appendix C

Typical Monitoring Well Construction Diagram



URS

TYPICAL
MONITORING WELL CONSTRUCTION

X:\x_env_waste\BP GEM\Sites\Jane Tingin_figures backup\Templates\MW-CONSTR.dwg

Appendix D

Pre-Drilling / Subsurface Checklist for Intrusive Fieldwork

PREDRILLING/SUBSURFACE CHECKLIST FOR INTRUSIVE FIELDWORK

Site Name _____ Job # _____

Site Phone Number: _____ _____

Site Address _____ County _____

BP EBM: _____ Phone _____

BP Site Manager Contacted On: _____ By: _____

Site Drawings (yes / no / NA) _____ (please attach) Historical Drawings (yes / no / NA) _____

As-Build Drawings (yes/no/NA) _____ (please attach)

Third Party Construction/Redevelopment Plans (yes/no/NA) (please attach)

***ATTACH SITE FIGURE WITH PROPOSED BORING LOCATIONS

Subcontractor's (drillers, concrete, etc...) Company _____

Subcontractor's Name / Contact Person _____ Phone _____

Meeting / Start Date _____ Time _____

1) Health and Safety Form Completed: Y / N Date _____

2) Mandatory Utility Protection Services Minimum 48 Hrs. Advance Notice (State Specific Notification Period Supercedes)

Called: Date _____ Time _____ Initials _____

Reference # _____

Proposed Drilling Locations Premarked for Locating Service. Y / N

3) Mandatory Private or In-House Utility Locating Service Performed? Y / N _____

Called: Date _____ Time _____ Initials _____

Name of Locating Service: _____

Telephone #/ contact: _____

Supplier Locating Technician: _____

Type of sensing equipment used: _____

Proposed Drilling Locations Premarked Y / N

4) Other Potential Underground Structures

Name of City Engineer/Utility Representative: _____

Telephone #: _____

Date Notified _____ Maps: Y / N

Cleared: Y / N

5) COMPLETED SITE WALKOVER W/ SITE MANAGER/DESIGNEE OR OWNER/TENANT REP. Y / N

Name of Site Manager: _____

Name of Property Owner/Tenant Representative: _____

Cleared: Yes / No

Building Utility Service Line Connections Identified: Y / N

Utility Service Line Points of Entry to the Property from Utility Mains Identified: Y / N

(Hand sketch on site map w/proposed boring locations and most likely utility trench locations)

6) Utility Inventory: Y / N

Utility	Name	Depth (ft)	Phone	Notified - Date	Marked
Above Ground Services:					
Electric		NA		Y / N	Y / N
Telephone		NA		Y / N	Y / N
Cable		NA		Y / N	Y / N
Overhead Supports		NA		Y / N	Y / N
Traffic light cables		NA		Y / N	Y / N

6) Utility Inventory Continued:

Below Ground Services:

Electric				Y / N		Y / N
Telephone				Y / N		Y / N
Cable				Y / N		Y / N
Gas				Y / N		Y / N
Water				Y / N		Y / N
UST System				Y / N		Y / N
Storm				Y / N		Y / N
Sanitary				Y / N		Y / N
Steam				Y / N		Y / N
Pipeline Companies				Y / N		Y / N

Other:

				Y / N		Y / N
				Y / N		Y / N
				Y / N		Y / N

7) **Site-Specific Emergency Contingency Plan Incorporated in Health & Safety Plan** Y / N

8) **Signature of Supplier Project Mgr. (required to begin fieldwork):**

High Risk Drilling Locations Approved by EBM Date: Y / N

(Predrilling Checklist and supporting information to be included with the site H&S Plan, present on-site during all intrusive investigations and available upon request.)

NAME OF PROJ. MGR. (PRINTED OR TYPED)

SIGNATURE OF PROJ. MGR.

Name of Supplier Field Personnel

Signature of Field Personnel

NOTE: Primary Contractor Signature is verification that Field Personnel have reviewed, adhered to and received the necessary supplier training to implement precautionary drilling standards for performing work at GEM Marketing Retail properties as defined in BP's PRECAUTIONARY PROCEDURES AND GUIDELINES FOR DRILLING, SUBSURFACE INVESTIGATIONS AND REMEDIAL CONSTRUCTION ACTIVITIES. Any questions or concerns should be elevated to the Primary Contractor Project Manager or EBM prior to initiating field work.

ADDITIONAL COMMENTS / NOTES: